

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

GENTEX CORPORATION and INDIGO
TECHNOLOGIES, LLC,

Plaintiffs,

THALES VISIONIX, INC.,

Involuntary Plaintiff,

v.

FACEBOOK, INC. and FACEBOOK
TECHNOLOGIES, LLC,

Defendants.

Case No. 6:21-cv-00755-ADA

JURY TRIAL DEMANDED

DEFENDANTS' OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

The presently disputed terms for construction fall within three categories.¹ For the first category, as demonstrated below, Defendants’ constructions are grounded in the intrinsic evidence, in some cases simply adopting express definitions set forth in the specification. Plaintiffs, however, either ignore those definitions or modify them without justification. For other terms, Plaintiffs simply avoid providing a construction altogether. This approach contradicts established Federal Circuit law and fails to resolve the parties’ disputes.

In the second category, Defendants identified certain claims that use subjective, ambiguous, or inconsistent terms that have no clear meaning to one of skill in the art in context, even in light of the patent’s disclosure. Under 35 U.S.C. § 112, every patent must particularly point out and distinctly claim an applicant’s invention. This fundamental requirement for clarity and precision ensures that a patent secures to the patentee the rights to which it is entitled, but also requires that the public receives clear notice of what is still open to them. Claims with ill-defined boundaries, like those here, defeat this public-notice function and are invalid as indefinite.

In the third category, the applicant’s failure to identify a structure in various means plus function terms renders those claims indefinite. The applicant selected purely functional language, but failed to recite any particular structure to perform the recited functions, *i.e.*, the claims describe a feature by what it *does* rather than by what it *is*. Although the claims at issue here do not use the word “means,” the applicants used “nonce” words the same or analogous to those the Federal Circuit and other courts have repeatedly found to be functional, lacking structure, and subject to § 112 ¶ 6. Defendants thus respectfully request that their constructions be adopted.

¹ Plaintiffs assert 136 claims and refuse to reduce that number despite the numerous claim construction disputes that result. But in accordance with the Court’s Standing Order and February 17, 2022 ruling, Defendants have limited their proposed terms for construction to 14.

II. OVERVIEW OF THE PATENTS

Plaintiffs assert U.S. Patent Nos. 6,757,068 (the “’068 Patent”), 7,301,648 (the “’648 Patent”), 8,224,024 (the “’024 Patent”), 6,922,632 (the “’632 Patent”), and 7,725,253 (the “’253 Patent”) (the “Asserted Patents”). Exs. 1–5. The patents fall into three families: the ’068 and ’648 Patents (“Family One”), the ’632 and ’253 Patents (“Family Two”), and the ’024 Patent (“Family Three”). The patents within each family share largely identical specifications and similar claims.²

A. Family One Patents

The ’068 and ’648 Patents’ claims are directed to position tracking. *See* ’068 Patent, 1:10, 1:36–42. These patents describe “mounting a tracker on a user’s head and using the tracker to track a position of a localized feature associated with a limb of the user relative to the user’s head.” *Id.*, 1:46–52, cls. 1, 40. The ’068 and ’648 Patents also discuss using a head-mounted display device to display a tracked virtual object or environment. *See id.*, 2:9–23, cl. 14. The patents state that the tracking technique is “essentially ‘sourceless’ in that it can be used anywhere with no set-up of a source, yet it enables a wider range of virtual environment-style navigation and interaction techniques than does a simple head-orientation tracker, including manual interaction with virtual objects.” *See id.*, 1:36–42.

B. Family Two Patents

The ’632 and ’253 Patents are directed to calculating the position of an object based on measurement information. *See* ’632 Patent, 1:17–20, 1:64–67. Each patent uses “inside-out” sensors “fixed to the object and makes measurements with respect to a target fixed to an environment,” or “outside-in” sensors “fixed to the environment and makes measurements with respect to a target fixed to the object.” *Id.*, 7:35–39. To refine the measurement, the patents use an

² For convenience, Defendants cite to the ’068 Patent for Family One and the ’632 Patent for Family Two, but the patents in each family contain substantially the same disclosure.

“estimation subsystem” that configures an algorithm (called a Kalman filter) to “estimate the sensor calibration parameters using a common infrastructure” that can be used to determine, among other factors, the location of the tracked object. *Id.*, 2:11–13, 10:21–22, cls. 52–58.

C. Family Three Patent

The '024 Patent includes only one method claim. The claim recites steps for obtaining and processing a camera image that has the locations of exactly two points on an object. The method further requires computing the object's azimuth (a type of angular measurement) from those locations. '024 Patent, cl. 1. The specification states that “the spatial location and azimuth of an object are computed from the locations, in a single camera image, of exactly two points on the object and information about an orientation of the object.” *Id.*, 2:40–43. “The information about an orientation of the object comes from a first inertial sensor mounted on the object.” *Id.*, 2:45–46. The orientation information includes pitch information, “and the pitch of the line containing the two points is equivalent to the pitch of the object.” *Id.*, 3:4–6. The location of the points on the object and orientation information is “used to obtain candidate values for the azimuth of the object. One azimuth value is selected based on an evaluation of the candidate azimuth values in equations relating the coordinate information and pitch information to distances of the points from the camera.” *Id.*, 4:16–20.

III. RELEVANT LEGAL STANDARDS

When construing terms, “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (citation omitted). A patentee’s definition controls where he “acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.” *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009). “[A] patent is invalid for

indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

Inventors may draft their claims “as a means or step for performing a specified function” as long as they disclose the structure that performs the function. *See* 35 U.S.C. § 112 ¶ 6 (pre-AIA); *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1347 (Fed. Cir. 2015). Otherwise, the term is indefinite. *Id.* at 1351. While there is a rebuttable presumption that § 112 ¶ 6 does not apply when the claim term lacks the word “means,” the *en banc* Federal Circuit confirmed that this is not a “strong” presumption, and it can be overcome whenever a claim “fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function.” *Id.* at 1349 (citations omitted). After determining that a term is governed by § 112 ¶ 6, courts must attempt to construe the disputed term by identifying the corresponding structure. *Robert Bosch LLC v. Snap-On Inc.*, 769 F.3d 1094, 1097 (Fed. Cir. 2014). For computer-implemented functions, courts “require that the specification disclose an algorithm for performing the claimed function.” *Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1349 (Fed. Cir. 2016) (citations omitted). “[A] general purpose computer” cannot be the structure “because this amounts to pure functional claiming.” *Id.*

IV. CONSTRUCTION OF THE DISPUTED TERMS

A. Family One Terms

1. “sourceless”/“sourceless orientation tracker”

Patents and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’068 Patent, claims 1, 11–13, 50, 54	Defendants: “sourceless”	“can be used anywhere with no set-up of a source”	Plain and ordinary meaning, in light of the claims and specification— <i>i.e.</i> , an orientation tracker that does not require setup of a fixed
’648 Patent, claims	Plaintiffs: “sourceless		

1, 16, 40, 41	orientation tracker”		source that propagates a signal to the tracked sensor
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In Family One, the asserted claims recite “sourceless” orientation trackers and “sourceless” measurements to track positions and orientations. *See, e.g.*, ’068 Patent, cl. 1; ’648 Patent, cl. 41. The inventor defined the term “sourceless,” and Defendants’ construction comes directly from that definition, provided in the patents’ Abstract and Summary of the Invention:

- **Abstract**: “A new tracking technique *is essentially ‘sourceless’ in that it can be used anywhere with no set-up . . .*”³ ’068 Patent, Abstract.
- **Summary of the Invention**: “In one aspect,⁴ in general, *the invention* provides a new tracking technique that *is essentially ‘sourceless’ in that it can be used anywhere with no set-up of a source.*” *Id.*, 1:36–38.

The use of quotations around “sourceless” and the transitional phrase “in that” both indicate the inventor intended to assign a definition to “sourceless.” *See Sinorgchem Co., Shandong v. Int’l Trade Com’n*, 511 F.3d 1132, 1136 (Fed. Cir. 2007) (using quotations around a term is “often a strong indication that what follows is a definition”). Where, as here, the specification defines a term, that definition must be used. *See Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009). Plaintiffs provide no rationale for deviating from this clear definition, particularly given that they have not identified any extrinsic evidence defining “sourceless.”

Defendants’ proposed construction for “sourceless” is consistent with the other uses of “sourceless” in the Family One Patent specifications. For example, dependent claims in the ’068 Patent recite a “sourceless orientation tracker” that comprises an inertial sensor (claim 11), a tilt-

³ All emphasis added unless otherwise noted.

⁴ The phrase “in one aspect” does not mean that “sourceless” has the stated definition in one aspect of the invention and another definition in another aspect, but instead relates to ways in which the “sourceless orientation tracker” could be used. *See* ’068 Patent, 1:36–38; *see also Boss Control, Inc. v. Bombardier Inc.*, 410 F.3d 1372, 1377 (Fed. Cir. 2005) (applying applicant’s definition of “interrupt” despite the definition following the phrase “[i]n accordance with one aspect of the invention”).

sensor (claim 12), or a magnetic compass sensor (claim 13). Similarly, the specification explains that “‘sourceless’ orientation trackers have been developed based on geomagnetic and/or inertial sensors.” *Id.*, 1:26–27. And the specification provides a commercial example of a “sourceless” orientation tracker in Figure 2, *e.g.*, the “InterSense IS-300 sourceless inertial orientation tracker” (*id.*, 5:45–47), which “can be used anywhere with no set-up of a source.” *Id.*, 1:35–37; Ex. 6 (META-GNTX-00002586).

Plaintiffs’ contention that the proper term for construction is “sourceless orientation tracker” rather than “sourceless” is incorrect. This is shown by Plaintiffs’ own construction, which repeats the phrase “orientation tracker” and thus confirms that the only term being construed is “sourceless.” Further, Plaintiffs’ proposal does not capture all uses of the term “sourceless” in the claims. For example, claim 41 refers to a “sourceless measurement,” and inserting Plaintiffs’ construction leads to a nonsensical result: “not requir[ing] setup of a fixed source that propagates a signal to the tracked sensor measurement.” *See, e.g.*, ’648 Patent, cl. 41. The patentee’s single, express definition of “sourceless” should apply to all claims. Plaintiffs’ proposed construction improperly modifies that definition, importing limitations from a phrase in the specification that discusses the prior art and does not even use the term “sourceless”: “[Mechanical, acoustic, magnetic, and optical systems] require propagation of a signal between a fixed ‘source’ and the tracked ‘sensor’ and therefore limit the range of operation.” ’068 Patent, 1:16–20. But importing limitations into the claim from the specification is improper absent a clear disavowal or disclaimer. *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1358 (Fed. Cir. 2016). Plaintiffs are correct that the claims on their face are “sourceless” and hence exclude systems that use a “source” that propagates a signal to the “sourceless orientation tracker.” But Plaintiffs’ assertion that the all excluded sources must also be “fixed” or that the “sensor” must be “tracked” (rather than the sensor

being the tracker) draws from language in the specification that merely identifies a problem in particular prior art systems, which the Federal Circuit has long recognized as insufficient to narrow a claim. *See ScriptPro LLC v. Innovation Assocs., Inc.*, 833 F.3d 1336, 1341 (Fed. Cir. 2016) (“mere recognition in the specification that an aspect of a prior art system is ‘inconvenient’ does not constitute ‘disparagement’ sufficient to limit the described invention”).

2. “track a position of a first localized feature”

Patents and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’068 Patent, claims 1, 54, 55	Defendants: “track a position of a first localized feature”	Indefinite	Plain and ordinary meaning, in light of the claims and specification— <i>i.e.</i> , track a position of a first part of a limb of a user, or an object or part of an object associated with a limb of the user
’648 Patent, claim 1	Plaintiffs: “track a position of a first localized feature associated with a limb of the user ”		

A POSITA would not have understood the meaning of the claimed “localized feature” with reasonable certainty. *See Nautilus*, 572 U.S. at 901. Although the patents’ claims repeatedly refer to “localized features,” they never explain what it means for a feature to be “localized,” what it would be “local” to, or what the difference is between a “localized feature” and any other type of feature. Neither do the specification or prosecution history. In fact, the specification only uses the term “localized” in a verbatim recitation of the claims in its “summary” section.

The patent does provide a few examples of what it means for a feature to be “associated with” a user’s limb, such as a hand-held object (’068 Patent, 14:9) or an object mounted on a user’s hand (*id.*, 5:8), but it does not provide any objective guidelines to determine what falls inside and outside the term “localized.” To the extent the term refers to a feature near a user’s limb as Plaintiffs appear to contend, that would add nothing to the phrase “associated with a limb” and, even if it did, the specification does not explain how close or far away a feature may be such that

it is considered “localized.” *Skyhook Wireless, Inc. v. Google, Inc.*, No. 10-11571-RWZ, 2014 WL 898595, *5–6 (D. Mass. Mar. 6, 2014) (holding that “far” was indefinite because “‘far’ is a word of degree, and ‘[d]efiniteness problems often arise when words of degree are used in a claim.’”). For example, it would not be clear to a POSITA whether tracking the position of a dog walked by a person would qualify as “track[ing] a position of a first localized feature associated with a limb of the user” because it is unclear what (if any) point on the leash or the dog would be considered sufficiently “localized.” Ex. 7 (“Bobick Decl.”) ¶¶ 29–30.

Moreover, a POSITA would not understand what this term means in context, because, among other reasons, it is not clear whether the feature is localized in two-dimensional space or three-dimensional space. The claim is ambiguous as to whether the “detector . . . track[s] a position of a first localized feature” in the display (2-D) or in the real world (3-D). Bobick Decl. ¶¶ 26–31. For example, how a two-dimensional position of a point on ball is tracked on an image sensor is different from how the three-dimensional position of that point on the ball in the real world is tracked, and a feature might thus simultaneously be “localized” and not “localized” depending solely on the dimensional frame of reference.

Plaintiffs’ proposed construction replaces the phrase “a first localized feature associated with the limb of the user” with “a first part of a limb of a user, or an object or part of an object associated with a limb of the user.” This construction attempts to avoid indefiniteness by grafting new limitations onto the claim in the form of specific examples, namely, limiting what a first “localized feature” can be to “a first part of a limb of a user, or an object or part of an object associated with a limb of the user.” But there is no basis to add these new limitations the claim (*e.g.* that a part of the limb itself is a localized feature) because the specification contains no such definition or clear disavowal or disclaimer. *See Unwired Planet*, 829 F.3d at 1358. The

specification never states that the scope of the claim is limited to Plaintiffs’ particular examples of “localized features.” Plaintiffs’ construction also does nothing to answer the question of whether the localized feature exists and is tracked in 2-D or 3-D space. Plaintiffs’ extrinsic evidence fails to elucidate the scope of a “localized feature” because it describes calculating localized feature *points* (Ex. 8 (GNTX0001630)) in an *image* (Ex. 8; Ex. 9 (GNTX0001617)), not “track[ing] a position of a first *localized feature* associated with *a limb of the user*.” Bobick Decl. ¶¶ 31, 32.

The specification provides no objective boundary for a POSITA to ascertain whether or not a feature is “localized,” and a “localized feature” has no specific meaning to a POSITA. This term is indefinite.

3. “redisplaying the first object at a second position on the display device determined based on the change in the position of the first localized feature”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’068 Patent, claim 26	“redisplaying the first object at a second position on the display device determined based on the change in the position of the first localized feature”	Indefinite	Plain and ordinary meaning, in light of the claim and specification.

Claim 26 requires “*redisplaying the first object at a second position* on the display device determined *based on the change in the position of the first localized feature*”—but claim 15, from which claim 26 depends, also requires “*redisplaying the first object at a second position* on the display device *based on the change in orientation*.” ’068 Patent, cls. 15 and 26. Because the claim limitations in claims 15 and 26 conflict and require redisplaying the first object at “*a second position*” based on different criteria—(1) a change in position of the first localized feature and (2) a change in orientation of the display device—a POSITA would not understand the scope of claim 26 with reasonable certainty. Bobick Decl. ¶¶ 37–41; *see TVnGO Ltd. (BVI) v. LG Elecs. Inc.*, 861 F. App’x 453, 460 (Fed. Cir. 2021) (holding a dependent claim indefinite where a term conflicted

with the independent claim’s use of the same term). As written, the claim is indefinite and provides no guidance as to its intended meaning.

4. “system”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’068 Patent, claim 56	“system”	The word “system” should be given its plain and ordinary meaning. The claim is indefinite, including at least as a mixed method and apparatus claim.	“method”

The Court should not rewrite this claim to substitute the word “method” for “system” because neither *Novo Industries* requirement is satisfied: the “correction” is subject to reasonable debate and the prosecution history suggests a different interpretation of the claims. *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1354 (Fed. Cir. 2003). One could, for example, interpret the claim as directed to a “system” capable of performing the recited functions. Further, the prosecution history suggests a different interpretation of the claims than Plaintiffs’ proposed “correction.” Ex. 10 (Jan. 26, 2001 App.) at GNTX0000296. Claim 56 issued exactly as it was originally submitted; there are no claim amendments that suggest the Applicant intended to use “method” instead of “system,” or that show any mistake when amending the claims. Moreover, claim 56 as-written is indefinite because it is directed to mixed statutory subject matter—a system and a method of using that system. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005).

5. “a body stabilized information cockpit”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’648 Patent, claim 20	“a body stabilized information cockpit”	“a display at a fixed location on an information surround, which is a kind of cylindrical or spherical bubble of information that follows the user’s body	Plain and ordinary meaning, in light of the claim and specification — <i>i.e.</i> , an information cockpit displayed at a

		position around”	fixed location relative to a user’s body
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Defendants’ proposed construction of “a body stabilized information cockpit” comes directly from the patentee’s clear definition in the specification. Plaintiffs’ proposed construction is inconsistent with the specification and only construes “body stabilized”; Plaintiffs repeat the term “information cockpit” in their construction.

Claim 20 recites “providing a head mounted display including a body stabilized information cockpit and displaying data to a user using such display.” The specification defines “body-stabilized objects”: “Body-stabilized objects *are* displayed at a fixed location on an information surround, [which is] a kind of cylindrical or spherical bubble of information that follows the user’s body position around.” ’648 Patent, 9:17–20. Defendants’ construction appropriately reflects this definition, which is controlling. Defendants’ construction is also consistent with the specification. For instance, in contrast to head stabilized “frequently-used icons” 401 that are “fixed” and “always visible” in FIG. 4, body stabilized icons 402 are “stabilized to the information cockpit, and therefore can only be seen when the user looks down a little to check them.” *Id.*, 10:19–25. That is, icons 402 are fixed on a location on an information surround, which follows the user’s body position around.

Plaintiffs’ construction does not match any definition in the specification. Instead, contrary to Plaintiffs’ newly minted construction, the specification describes different stabilization techniques for objects based on where they appear: objects that are head stabilized are displayed at a fixed location *on the HMD screen*, objects that are world stabilized are fixed to locations *in the physical environment*, and objects that are body stabilized “are displayed at a fixed location *on the information surround*, [which] is a kind of cylindrical or spherical bubble of information that follows the user’s body position around.” *Id.*, 9:12–20.

B. Family Two Terms

1. “expected” / “highest expected” terms

Patents and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 Patent, claims 3, 11, 12, 14, 21, 30, 32, 33, 34	“expected” / “highest expected” ⁵	Indefinite	Plain and ordinary meaning, in light of the claims and specification.
’253 Patent, claim 7			

The terms “expected” and “highest expected” as recited in the Family Two claims are indefinite because they do not allow a POSITA to understand the scope of the claims with reasonable certainty. These terms are used in the claims in two contexts: (1) to describe “sensor measurement(s)” and (2) to describe “utility.” Claims 3, 11, 12, 14, 30, and 32 of the ’632 Patent describe certain sensor measurements as “expected,” use those “expected” measurements, and differentiate those measurements from “actual” measurements. For example, claim 3 requires “receiving information related to *an expected sensor measurement* and providing measurement information *that depends on said received information.*” See also ’632 Patent, cl. 14 (“calculat[ing] a difference between the *actual* measurement and the *expected* measurement”). But the word “expected” is context-dependent. For example, whether a measurement is “expected” could depend on the relative location and calibration of the sensors, the precision and error values of the measurement tools and sensors, human error, or individual subjective expectations. Bobick Decl. ¶ 45. The claims never limit an “expected” measurement to a particular calculation never recite how to determine whether or not a particular measurement is “expected.” And while the specification provides an *example* of one type of “expected measurement based on the estimated pose,” this example is limited to the context of Kalman filtering. ’632 Patent, 15:47–52 (merely

⁵ Plaintiffs propose that the “full term” as used in the identified claims should be construed rather than “expected” and “highest expected.” Defendants address this term collectively because it should be construed the same way in each of the “full terms” identified by Plaintiffs.

noting that this “expected measurement” is “useful”); Bobick Decl. ¶¶ 44-45. These claims are not expressly limited to Kalman filter approaches, however, and thus the example does not limit the open-ended, subjective nature of the term “expected” as used in the claims. Bobick Decl. ¶ 45; *see also Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1251 (Fed. Cir. 2008) (finding term indefinite despite description in specification because the specification failed to provide guidance as to the full claim scope).

Claims 21, 33, and 34 of the ’632 Patent, and claim 7 of the ’253 Patent require that sensors are selected based on the “expected utility” or “highest expected utility” of their measurements. These claims and the specification fail to provide guidance on what utility is “expected” or how to determine the bounds of what is the “**highest** expected” utility as noted above. Moreover, the specification similarly does little to shed light on what the “utility” of a measurement is in the contexts covered by the claims’ full scope. Bobick Decl. ¶¶ 46–48. Although the specification in one location describes “an ‘information gain’ that represents the utility (or usefulness) of a measurement,” ’632 Patent, 19:34–37, that discussion does not provide any objective definition for utility or provide objective guidance as to whether a measurement is useful or not. In contrast, the patent later confirms that “information gain” is context-dependent and “may depend on both the type of the sensor and the circumstances of the measurement.” *Id.*, 26:20–43; Bobick Decl. ¶ 46. As the patent explains, in one circumstance, a laser range finder may have a higher gain than an ultrasonic range finder, while in another circumstance, the ultrasonic range finder may have a higher gain than the laser range finder. ’632 Patent, 26:27–35; Bobick Decl. ¶ 47. The patent further explains that the selection of a sensor-target pair with the greatest information gain (*i.e.*, the “highest expected utility”) is “difficult to make independently” and only provides a single “suboptimal” equation for making this determination. ’632 Patent, 26:44–62. But this equation

only applies in the context of Kalman filtering. Bobick Decl. ¶ 48. The specification provides no guidance for other, more “optimal” ways to determine highest information gain outside of the Kalman filter context, even though the claims are not so limited. Different methods could lead to different sensor-target pairs having the greatest information gain depending on the method used. Without further guidance, therefore, a given measurement could simultaneously infringe and not infringe, rendering this term indefinite. *See Geneva Pharms., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003).

2. “characterizes” / “characterizing” terms

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 Patent, claims 5, 6, 13, 17, 18, 19, 59, 60, 61	“characterizes” / “characterizing” ⁶	Indefinite	Plain and ordinary meaning, in light of the claims and specification.

The phrases that use the terms “characterizes” and “characterizing” in the ’632 Patent claims are indefinite because they do not inform a POSITA about the scope of the claims with reasonable certainty. The claims and specification repeatedly require “characteriz[ing]” various pieces of information—*e.g.*, estimates of location, configuration information, uncertainty, a type of sensor, position and orientation, and calibration parameters (*see, e.g.*, ’632 Patent, cls. 5, 6, 13, 17–19, 59–61)—without explaining what “characterizing” encompasses in each of these contexts.

The patent reflects that “characterizing” something must refer to more than simply providing or producing the thing itself because the claims and specification repeatedly differentiate between data itself and characterizations of that data. Claim 44, for example, requires “*estimating*” or “*assigning*” “calibration parameter[s],” while claim 61 requires “*characterizing*” “calibration

⁶ Plaintiffs propose that the “full term” as used in the identified claims should be construed rather than “characterizes” and “characterizing.” Defendants address this term collectively because it should be construed consistently across the “full terms” identified by Plaintiffs.

parameters.” Claim 59 requires “**providing** configuration information” (unlike claim 6, which “characterizes configuration information”) and then requires that the configuration information “**characteriz[e]** a type of sensor.” And the specification differentiates between “identify[ing] a . . . type of sensor” and “**characterizing** a type of sensor.” *Id.*, 7:15–17, 10:7–9. But, the patent never explains what the terms “characterizes” or “characterizing” add, and they have no commonly understood meaning in the art that is consistent with the indiscriminate manner in which the patent claims attempt to use them. Bobick Decl. ¶¶ 53–61 (explaining, *e.g.*, that although these terms may have meaning in a specific type of algorithm, the terms are used in asserted claims that are not limited to that algorithm and in manner that lacks any context relevant to that algorithm).

Furthermore, applying the plain and ordinary meaning of “characterizing,” as Plaintiffs propose, would only confirm that the claims are indefinite. Extrinsic evidence confirms that “characterize” and “characterizing” require an unspecified, subjective value judgement of the “character or quality of” something. *See, e.g.*, Ex. 11 (MERRIAM-WEBSTER’S COLLEGIATE DICTIONARY (11th ed. 2007) (“to describe the **character or quality** of”)); Ex. 12 (THE AMERICAN HERITAGE COLLEGE DICTIONARY (3rd ed. 1997) (“[t]o describe the **qualities or peculiarities** of”)). But the claims and specification do not provide any guidance to inform a POSITA with reasonable certainty how this value judgment is to be made, let alone any objectively determinable bounds for that judgment across each use of the “characterizing” terms. For example, a position or orientation is usually described in objective terms (*e.g.*, with coordinates and angles). “Characterizing” introduces a subjective, qualitative, or opinion-based element to the position or orientation—*e.g.* how one person might “characterize” a position or orientation may be totally different from how someone else might do so. Likewise, characterizing an “estimate,” “relative location,” or an “uncertainty” suffers the same problem and exacerbates it because these are already terms of

degree with no objective boundaries. *See, e.g., Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018).

To make matters worse, the use of the term “characterize” / “characterizing” in the asserted claims is inconsistent. *Fin Control Sys. Pty., Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001) (“[T]he same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.”). Bobick Decl. ¶ 53-61. This inconsistency is made evident by the variety of items “characterized.” For example, how one “characterizes” an estimate of location is not the same as how someone would “characterize[]” a type of sensor. What “characterizes” means in each instance then would necessarily, but ambiguously, differ such that a POSITA would not understand the scope of the claim with reasonable certainty. *Id.* Yet, even if these terms were permitted to have different meanings amongst different (yet in many instances interdependent) claims in the same patents, the specification still lacks the requisite specificity to understand the metes and bounds of “characterize” and “characterizing” in each of the different contexts. Bobick Decl. ¶¶ 54–60.

Because the “characterizing” terms as used in the asserted claims have an undefined scope, they are indefinite. *See Nautilus*, 572 U.S. at 910.

3. “generating a sequence of candidates of pairs of sensing elements selected from the set of sensing elements, the sequence based on an expected utility of a measurement associated with said elements to the estimation subsystem”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 patent, claim 33	“generating a sequence of candidates of pairs of sensing elements selected from the set of sensing elements, the sequence based on an <i>expected utility</i> of a measurement associated with said	Indefinite	Plain and ordinary meaning, in light of the claims and specification.

	elements to the estimation subsystem”		
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For the reasons stated in Section IV.B.1, the term “generating a sequence of candidates of pairs of sensing elements selected from the set of sensing elements, the sequence based on an *expected utility* of a measurement associated with said elements to the estimation subsystem” in claim 33 of the ’632 Patent is indefinite.

4. Means-Plus-Function Terms

The law prohibits purely functional claiming other than in claims construed under the means-plus-function requirements of 35 U.S.C. § 112 ¶ 6. While there is a rebuttable presumption that § 112 ¶ 6 does not apply when the claim term lacks the word “means,” this is not a “strong” presumption, and it can be overcome whenever “the claim term fails to recite sufficiently definite structure or else recites a function without reciting sufficient structure for performing that function.” *Williamson*, 792 F.3d at 1349 (quotation marks and citations omitted); *see also Diebold Nixdorf, Inc. v. Int’l Trade Comm’n*, 899 F.3d 1291, 1298 (Fed. Cir. 2018).

a. “estimation module”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 Patent, claims 47, 48, 49, 50, 51, 52, 62, 63, 64, 65, 68, 69	“estimation module”	Subject to U.S.C. § 112, ¶ 6. Function: <i>See</i> Appendix A Structure: Indefinite	Plain and ordinary meaning, in light of the claims and specification— <i>i.e.</i> , “module that accepts sensor configuration and measurement information and updates a state estimate using some or all of that information.” (35 U.S.C. § 112, ¶ 6 does not apply.) If 35 U.S.C. § 112, ¶ 6 applies, function and structure identified in Appendix A.

i. “estimation module” is subject to § 112 ¶ 6

The ’632 Patent claims consistently refer to the “estimation *module*” as a black box specified only by the functions it performs or enables. *See, e.g.*, ’632 Patent, cl. 68 (“estimat[ing]

a pose of an object based on measurement data from sensing elements”); Appx. A. Where a claim recites the well-known nonce word “module” and a modifier “estimation” that adds no structure—the Federal Circuit has found that the term should be interpreted under § 112 ¶ 6. *See Rain Computing, Inc. v. Samsung Electronics America, Inc.*, 989 F.3d 1002, 1006–07 (Fed. Cir. 2021) (“user identification module” is a means-plus-function term); *Williamson*, 792 F.3d at 1350–51 (Fed. Cir. 2015) (“distributed learning control module” is a means-plus-function term). Likewise, “module” here does not provide any structure and the “estimation” modifier does not impart structure—it simply describes a function (“estimation”) that the module performs. *See Williamson*, 792 F.3d at 1350; Bobick Decl. ¶ 67–68.

Further, “estimation module” has no commonly understood meaning and is not generally viewed by one skilled in the art to connote a particular structure. Bobick Decl. ¶ 67. The ’632 specification does not impart any structural significance to the term, and instead only briefly identifies in its Summary section what the “estimation module” *does*, not what it *is*. *Id.*; *see also* ’632 Patent, 7:39–9:3. In fact, the specifications descriptions of the “estimation module” all mimic the claims and fail to identify any structure whatsoever.

Although Plaintiffs refuse to acknowledge that this term is subject to the requirements of § 112 ¶ 6, their proposed construction merely repeats the word “module”—without identifying any particular structure—and describes a subset of the functions the module performs. This proposal makes clear that Plaintiffs believe that *any* nonce “module” that performs the recited functions can satisfy the asserted claim, confirming that the term is purely functional.

ii. “estimation module” is indefinite

The claimed functions for the “estimation module” are detailed in Appendix A. Nothing in the ’632 Patent specification discloses sufficient structure clearly linked to those claimed functions. Therefore, “estimation module” is indefinite. The specification never discusses an

“estimation module” outside of its “Summary” of the claims, nor does it specify what structure is linked to the claimed functions that the “estimation modules” must perform. *See* Appx. A. Further, the few references to “estimation module” in the Summary only discuss the “estimation module” in the context of the functions it performs. Bobick Decl. ¶ 69. Because the specification is silent as to any structure for the claimed “estimation module,” the term is indefinite. *See Bosch*, 769 F.3d at 1099–1100.

Plaintiffs’ alternative § 112 ¶ 6 construction fails to identify any adequate structure for their identified functions. Plaintiffs describe the alleged structure in purely functional language, stating that “the structure is ‘accepting configuration information’” *See* Appx. A. Plaintiffs’ failure to identify any corresponding structure confirms that the term “estimation subsystem” is indefinite.

b. “estimation subsystem”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 Patent, claims 1, 2, 4, 14, 33	“estimation subsystem”	Subject to U.S.C. § 112, ¶ 6. Function: <i>See</i> Appendix A Structure: Indefinite	Plain and ordinary meaning, in light of the claims and specification— <i>i.e.</i> , “subsystem that accepts sensor configuration and measurement information and updates a state estimate using some or all of that information.” (35 U.S.C. § 112, ¶ 6 does not apply.) If 35 U.S.C. § 112, ¶ 6 applies, function and structure identified in Appendix A.
’253 Patent, claims 1, 3, 4, 6			

i. “estimation subsystem” is subject to 112 ¶ (6)

The ’632 and ’253 Patent claims consistently refer to the “estimation subsystem” as a black box specified only by the functions it performs, including “accepting configuration data from the sensor subsystem” and “repeatedly updating a state estimate” (’632 Patent, cl. 1); and “updat[ing] a location estimate for the object based on configuration data” (’253 Patent, cl. 1). *See* Appx. A. Nothing in the claims provides any detail as to the makeup of the “estimation subsystem.”

Moreover, the term “estimation subsystem” is a nonce word that fails to connote structure to a POSITA (particularly where the claims fail to recite any system as to which the “subsystem” might be a part). Indeed, courts regularly find that terms like “subsystem” and “system” are nonce words subject to means-plus-function construction. *Velocity Pat. LLC v. FCA US LLC*, No. 13-C-8419, 2018 WL 4214161, at *7 (N.D. Ill. Sep. 4, 2018) (construing “subsystem”); *Dyfan, LLC v. Target Corp.*, No. W-19-CV-00179, 2020 WL 8617821, at *8 (W.D. Tex. Nov. 24, 2020) (construing “system”). The “estimation” prefix fails to impart any structure to the term because “estimation” does not describe a sufficiently definite structure (or any structure), and no such structure is identified in the specification. *See Williamson*, 792 F.3d at 1350–51 (finding “[t]he prefix ‘distributed learning control’ [did] not impart structure into the term ‘module’” when “these words [did] not describe a sufficiently definite structure,” even where there was some description of the prefix in the specification); Bobick Decl. ¶¶ 73–74. The specification also does not indicate that “estimation subsystem” connotes structure to a POSITA, instead repeatedly referring to it in a purely functional manner. *See* ’632 Patent, 2:35–59, 3:25–28, 4:11–31, 6:57–64. At most, the specification provides illustrative examples of filters (algorithmic equations) that can be configured or implemented by the “estimation subsystem.” *See, e.g., id.*, 10:42–43 (“The estimation subsystem implements a distributed Kalman Filter.”); *see also id.*, 10:40–64. Those examples of functions the subsystem can carry out, however, do not demonstrate that a POSITA would recognize an “estimation subsystem” as connoting structure, but rather simply that the subsystem can be used to implement certain filter functions. Bobick Decl. ¶¶ 75–76.

Although Plaintiffs refuse to acknowledge that this term is subject to the requirements of § 112 ¶ 6, their proposed construction merely repeats the word “subsystem”—without identifying any particular structure—and describes certain functions the “subsystem” performs. This proposal

makes clear that Plaintiffs believe that *any* “subsystem” that performs the recited functions can satisfy the asserted claims, confirming that the term is purely functional.

ii. “estimation subsystem” is indefinite

The claimed functions for the “estimation subsystem” are detailed in Appendix A.

As noted above, the specification describes an “estimation subsystem” with generic, functional statements about what the estimation module does. The specification does not disclose the structure of the “estimation subsystem” or specify what structure is linked to the claimed functions. Instead, the specification states (in its “Summary” of the claims) that the “‘estimation subsystem’ is configured to update a location estimate” or “estimates a position or orientation of an object.” ’632 Patent, 4:18–19, 55–57. The Summary also provides that the “estimation subsystem” “implements an Extended Kalman Filter” and a “distributed Kalman filter,” as well as several other undefined filters such as a “localization filter” or a “mapping filter.” *Id.*, 10:40–43. These mere claim summaries fail to disclose any corresponding structure and moreover lack the kind of step-by-step description of an algorithm the Federal Circuit requires for computer-implemented functions. *See Ergo Licensing, LLC v. CareFusion 303, Inc.*, 673 F.3d 1361, 1365 (Fed. Cir. 2012) (finding means-plus-function term indefinite where “[t]he specification merely provides functional language and does not contain any step-by-step process” for the algorithm). But even if these statements were sufficient to provide structure—they are not—none of those statements is *clearly linked* to *any* specific function, much less the recited functions in the ’632 and ’253 Patent claims. ’632 Patent, 10:40–64; Bobick Decl. ¶¶ 75–76. With no corresponding structure clearly linked to the claimed function, the claims reciting “estimation subsystem” are indefinite. *Diebold*, 899 F.3d at 1303.

As with “estimation module,” Plaintiffs’ alternative § 112 ¶ 6 construction fails to identify adequate structure because Plaintiffs describe the alleged structure in purely functional language:

“the structure is ‘accepting configuration data’” *See* Appx. A.

c. “sensor module”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 patent, claims 47, 48, 49, 50, 54, 55, 57, 59, 60, 61	“sensor module”	Subject to U.S.C. § 112, ¶ 6. Function: <i>See</i> Appendix A Structure: Indefinite	Plain and ordinary meaning, in light of the claims and specification— <i>i.e.</i> , “interface or interfaces between a set of one or more sensors and a tracking system.” (35 U.S.C. § 112, ¶ 6 does not apply.)
’253 patent, claims 2–4			If 35 U.S.C. § 112, ¶ 6 applies, function and structure identified in Appendix A.

i. “sensor module” is subject to § 112 ¶ 6

The term “sensor module” as it appears in the claims of the ’632 and ’253 Patents should be construed under 35 U.S.C. § 112 ¶ 6. As noted above in Section IV.B.4.a.i, “module” is a nonce term devoid of structure. Adding the modifier “sensor” to “module” fails to provide the missing structure because the claims make clear that a “sensor module” is something *different* from a sensor. *See, e.g.*, ’632 Patent, cl. 47 (“sensor modules” are “*associated with* a different set of one or more sensors”). Moreover, the remainder of the claim language only describes functions the black-box “sensor module” performs. For example, the claims describe the “sensor module” as “providing configuration information,” receiving “data based on the estimates of the tracking parameters,” and sending “data based on measurements obtained from the associated sensors” but never indicate the structure or class of structures to which the “sensor module” belongs. *Id.*

The specification confirms that the patentee did not view “sensor module” as having a commonly understood structure. The only portion of the specification discussing the “sensor module” term (outside of the summary repeating the claims) explains that “[s]ensor modules are implemented *in software*” and lists examples of functions carried out by that software. *See* ’632 Patent, 9:61–67, 10:1–16, 10:34–37. Nothing in the specification describes the “sensor module”

as having any particular structure. Further, “sensor module” does not have a well-understood meaning and is not viewed by a POSITA to connote a particular structure. Bobick Decl. ¶¶ 80–81.

Plaintiffs appear to concede that “sensor modules” are not “sensors,” replacing the nonce term “sensor module” with the term “interface” in their proposed construction. The term “interface” in this context, however, is just another nonce placeholder for whatever software performs the identified functions. The term should be subject to § 112 ¶ 6. *Williamson*, 792 F.3d at 1351.

ii. “sensor module” is indefinite

Because nothing in the ’632 and ’253 Patent specifications discloses sufficient structure clearly linked to the claimed functions, “sensor module” is indefinite.

In claim 47 of the ’632 Patent, the function for “sensor module” is “providing configuration information to the estimation module regarding characteristics of the sensors associated with the sensor module”; “receiving data based on estimates of the tracking parameters from the estimation module”; and “sending data based on measurements obtained from the associated sensors.” *See* Appx. A. The recited function for “sensor module” in claims 2 and 4 of the ’253 Patent is “providing an interface for interacting with a corresponding set of one or more sensing elements.” ’253 Patent, cls. 2, 4.

When the specification discusses “sensor modules,” it does so in generic, functional statements about what the sensor modules do. The specification does not disclose the structure of the “sensor module” or specify what structure is linked to the claimed functions. For example, the specification provides that the “sensor modules” “provide[] measurement related parameters for the sensors” and “repeatedly accept the state-related information and combine that information with sensor measurement information, and pass the combined information to the estimation subsystem.” ’632 Patent, 10:15–16, 10:34–37. Likewise, the patents’ explanation that “[s]ensor

modules are implemented in software” (*id.*, 9:61) fails to provide sufficient structure because it never discloses a specific algorithm for performing the claimed functions as required. *See, e.g., Advanced Ground*, 830 F.3d at 1349. Further, the passing references to software in the specification with respect to “sensor modules” are not clearly linked to the “providing” function that the “sensor module” must perform. Bobick Decl. ¶¶ 82–84. For example, the specification states that the “sensor modules are implemented as dynamically loaded software modules” and are “automatically detected by the system.” ’632 Patent, 10:1–4. These isolated statements do not clearly link the generic “dynamically loaded software module” to any specific function, much less the function recited in the claims. With no corresponding structure clearly linked to the claimed function, the claims reciting “sensor module(s)” are indefinite. *Diebold*, 899 F.3d at 1303.

As with the means-plus-function terms above, Plaintiffs’ alternative § 112 ¶ 6 construction fails to identify adequate structure, as Plaintiffs describe the alleged structure in purely functional language: “the structure is ‘providing configuration information’” *See* Appx. A.

d. “sensor subsystem”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’253 Patent, claims 1, 2	“sensor subsystem”	Subject to U.S.C. § 112, ¶ 6. Function: <i>See</i> Appendix A Structure: Indefinite	Plain and ordinary meaning, in light of the claims and specifications— <i>i.e.</i> , “subsystem that provides configuration information and measurement information from sensors to the estimation subsystem.” (35 U.S.C. § 112, ¶ 6 does not apply.) If 35 U.S.C. § 112, ¶ 6 applies, function and structure identified in Appendix A.

i. “sensor subsystem” is subject to § 112 ¶ 6

The term “sensor subsystem” as it appears in the claims should be construed under 35 U.S.C. § 112 ¶ 6 because (1) “subsystem” is a nonce term devoid of structure; (2) the addition of “sensor” does not connote any structure; and (3) the remainder of the claim only describes the

sensor subsystem’s functionality without any structure. Bobick Decl. ¶¶88–89. For example, the claims recite the “sensor subsystem” “provid[ing] configuration data to the estimation subsystem” and “provid[ing] measurement information to the estimation subsystem for localizing an object” but never recite what the “sensor subsystem” is. Further, although the specification provides examples of functions that the “sensor subsystem” performs, or the subsystem’s purposes, each of those examples relates (at best) to the sensor subsystem’s functionality, not its structure. *See* ’632 Patent, 2:35–52, 3:10–15, 4:7–20. None of those descriptions provides any particular structure for the estimation subsystem.

ii. “sensor subsystem” is indefinite

The recited function for “sensor subsystem” is “providing configuration data to the estimation subsystem and providing measurement information to the estimation subsystem for localizing an object.” *See* Appx. A. As explained above, the specification never discusses a “sensor subsystem,” nor does it specify what structure is linked to the claimed function of “providing configuration data.” Bobick Decl. ¶ 90. Because the specification is silent as to the structure of the claimed “sensor subsystem,” the term is invalid for indefiniteness. *See Bosch*, 769 F.3d at 1099–1100.

As with the means-plus-function terms above, Plaintiffs’ alternative § 112 ¶ 6 construction fails to identify adequate structure, as Plaintiffs describe the alleged structure in purely functional language: “the structure is ‘providing configuration data’” *See* Appx. A.

e. “data processing module”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’632 Patent, claims 66 and 67	“data processing module”	Subject to U.S.C. § 112, ¶ 6. Function: <i>See</i>	Plain and ordinary meaning, in light of the claim and specification— <i>i.e.</i> , “module that, based on configuration information indicating a set of available sensing elements and data from at least one sensor,

		Appendix A Structure: Indefinite	updates an estimated pose of an object.” (35 U.S.C. § 112, ¶ 6 does not apply.) If 35 U.S.C. § 112, ¶ 6 applies, function and structure identified in Appendix A.
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i. “data processing module” is subject to § 112 ¶ 6

“Data processing module,” as recited in claims 66 and 67 of the ’632 Patent should be construed under 35 U.S.C. § 112 ¶ 6. As described above, “module” is a well understood “nonce” term that does not connote structure. *See supra* Section IV.B.4.a. The prefix “data processing” does not provide structure either; it simply describes the functionality of the module. Bobick Decl. ¶¶ 94–95. The claims do not provide that missing structure, as they merely recite several functions the data processing module performs with no reference to any structure. Further, a POSITA would not understand the term “data processing module” to have a known structure. *Id.*

ii. “data processing module” is indefinite

The function for “data processing module” in claim 66 is “selectively perform[ing] one of” a list of possible actions, each of which include “receiving data” from one or more sensors and “updating an estimated pose of an object.” *See* Appx. A. The function for “data processing module” in claim 67 is “selectively perform[ing] one of” a list of actions, each of which includes “receiving data” from one or more sensors and/or a range sensor and “updating an estimated pose of an object.” *Id.*

Nothing in the ’632 Patent claims or specification discloses sufficient structure clearly linked to the functions recited in claims 66 and 67. The specification never discusses “data processing module” outside of the rote claim summary in the Summary section, where “data processing module” is listed as performing particular functions in the same way recited in the claims. *See* ’632 Patent, 8:8–44. Nothing in that summary provides any particular structure. *Id.*; Bobick Decl. ¶ 96. And while the specification does describe a “data processing unit 190,” it never

clearly links that “data processing unit” to any of the recited functions of claims 66 and 67. *Id.*, ¶ 100. *Diebold*, 899 F.3d at 1303. Accordingly, “data processing module” is indefinite.

C. Family Three Terms

1. Claim 1 Preamble

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’024 Patent, claim 1	“A method comprising obtaining a camera image from a camera and processing said camera image in a data processor by computing the spatial location and azimuth of an object from the locations, in said camera image, of exactly two points on the object, and information about an orientation of the object, and generating one or more signals representative of the location and azimuth of the object, wherein computing the azimuth of the object comprises”	“Preamble” is limiting.	<p>Plain and ordinary meaning, in light of the claim and specification.</p> <p>Non-limiting with the exception of the following portion: “obtaining a camera image from a camera and processing said camera image in a data processor.”</p>

Plaintiffs admit that a portion of the preamble is limiting, but they arbitrarily select which portion limits the claim and ask the court to ignore the rest of the preamble. Contrary to Plaintiffs’ position, the entire preamble is limiting because it recites essential steps for the rest of the claim, is relied upon in the body of the claim for antecedent basis, and is a necessary component of the invention. *See Proveris Sci. Corp. v. Innovasystems, Inc.*, 739 F.3d 1367, 1372–73 (Fed. Cir. 2014) (“The preamble may be construed as limiting when it recites particular structure or steps that are highlighted as important by the specification” and “when limitations in the body of the claim rely upon and derive antecedent basis from the preamble”) (citations omitted).

First, the preamble gives context for construing and understanding other limitations in the claim. Claim 1, reproduced below, starts with “A method comprising” and then recites four method steps in the so-called “preamble” (obtaining, processing, computing, and generating), followed by a wherein clause that further limits the “computing” step:

1. *A method comprising* obtaining a camera image from a camera and processing said camera image in a data processor by computing the spatial location and azimuth of an object from the locations, in said camera image, of exactly two points on the object, and information about an orientation of the object, and generating one or more signals representative of the location and azimuth of the object, *wherein computing the azimuth of the object comprises:*

receiving coordinate information for images, on an imaging device of a camera, of two points on an object,

receiving pitch information from a sensor on the object,

using the coordinate information and the pitch information to obtain candidate values for the azimuth of the object,

selecting one azimuth value based on an evaluation of the candidate azimuth values in equations relating the coordinate information and pitch information to distances of the points from the camera.

Indeed, this language is only a “preamble” in a formatting sense—substantively, it starts with the phrase “A method *comprising*” and hence everything after the word “comprising” constitutes a required part of the claimed method. Because the claim body merely recites steps that further define the “computing the azimuth of the object” step, it does not on its own recite the complete invention, and does not make sense without the context provided by the preamble. The preamble recites “essential structure or steps” that should accordingly be treated as claim limitations. *Proveris*, 739 F.3d at 1372 (where the preamble was the only reference in the independent claim to the allegedly inventive concept, it was limiting). As the preamble explains, computing the azimuth is only part of the claimed method—an image must also be obtained and processed, and once the location and azimuth are computed, additional signals must be generated. This description is consistent with the specification, which describes the invention as related to the tracking of objects by processing an obtained image to obtain the location and azimuth. ’024 Patent, 1:12, 2:40–43. This alleged “essence” of the invention is only addressed by the preamble.

Second, the preamble of claim 1 is limiting because it provides antecedent basis to terms

in the claim body. *Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) (“When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, the preamble may act as a necessary component of the claimed invention.”). Here, the preamble provides antecedent basis for “images” and “azimuth of an object.” The preamble states “obtaining *a camera image* from a camera” and “processing *said camera image* in a data processor.” The claim body describes “computing the azimuth of the object” involves “receiving coordinate information for *images*.” The preamble also states how a data processor computes “spatial location and *azimuth of an object*,” the claim body further references back to this term in reciting use of coordinate and pitch information “to obtain candidate values for *the azimuth of the object*” by selecting one azimuth value based on evaluation of candidate azimuth values.

Plaintiffs do not dispute that the preamble is limiting but arbitrarily contend that only a portion of the preamble is limiting—the “obtaining” step. This makes little sense because it ignores all the other method steps expressly recited after “comprising” in the preamble, including the portion that provides antecedent basis for “azimuth.” Moreover, the portions Plaintiffs have excluded as limiting do not merely recite a purpose or an intended use but describe essential steps needed to implement the invention. *See Bio-Rad Lab’ys, Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1371 (Fed. Cir. 2020) (declining to find a preamble “partially” limiting where the drafter intended to limit the claimed method by using both the preamble and the body to define the invention).

2. “obtain candidate values for the azimuth of the object”

Patent and Claims	Term	Defendants’ Construction	Plaintiffs’ Construction
’024 Patent, claim 1	“obtain candidate values for the azimuth of the object”	“obtain multiple azimuth values for the azimuth of the object”	Plain and ordinary meaning, in light of the claim and specification

The term “obtain candidate values for the azimuth of the object” means “obtain multiple azimuth values for the azimuth of the object,” as consistent with the intrinsic record. Claim 1

recites “using the coordinate information and the pitch information to *obtain candidate values for the azimuth of the object*” and “*selecting one azimuth value based on an evaluation of the candidate azimuth values . . .*.” As the claim makes clear, the candidate values from which the azimuth is selected are multiple possible values for the azimuth. The specification is consistent, describing how multiple possible azimuth values are evaluated by solving quadratic solutions for ψ . ’024 Patent, 6:49–52. Accordingly, the specification also supports that four—*i.e.*, multiple—possible values are evaluated to determine an azimuth. *Id.*, 6:57–60.

During prosecution, the applicant proposed new claim 43 (which issued as ’024 Patent, claim 1). Ex. 13 (May 3, 2011 Resp. to NFOA) at GNTX0000182, GNTX0000197. The Examiner issued a Final Action on September 22, 2011, rejecting other pending claims, but allowed claim 43, noting that the prior art failed to disclose “obtaining *multiple* azimuth values and selecting one of the values based on an evaluation of all of the values in equations relating the coordinate information and pitch information to distances of the points from the camera” in its reasons for allowance. Ex. 13 (Sept. 22, 2011 FOA) at GNTX0000215. The Examiner repeated this in the Notice of Allowance. Ex. 13 (Apr. 2, 2012 NOA) at GNTX0000238–239. When an Examiner make statements regarding claim interpretation and the applicant does not rebut the statements, the Examiner’s statements may be used to construe the claim. *See Saffran v. Johnson & Johnson*, 712 F.3d 549, 559–60 (Fed. Cir. 2013). Here, the applicant never rebutted the Examiner’s reason for allowance and instead cancelled all other rejected claims so the application could be allowed. Ex. 13 (Feb. 21, 2012 Resp. to FOA) at GNTX0000226, GNTX0000232.

D. CONCLUSION

Defendants respectfully requests that the Court adopt their proposed constructions.

Dated: February 28, 2022

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CERTIFICATE OF SERVICE

The undersigned certifies that on February 28, 2022 all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system.

/s/ Akshay S. Deoras
Akshay S. Deoras

APPENDIX A

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
<p>"estimation module"</p> <p>'632 patent, claims 47–52, 62, 63, 64, 65, 68–69</p>	<p>Function:</p> <ul style="list-style-type: none"> '632 patent, claim 47–52: "maintaining estimates of tracking parameters in the estimation module, including repeatedly passing data based on the estimates of the tracking parameters from the estimation module to one or more of the sensor modules, receiving from said one or more sensor modules at the estimation module data based on measurements obtained from the associated sensors, and the data passed to the sensor modules, and combining the data received from said one or more sensor modules and the estimates of the tracking parameters in the estimation module to update the tracking parameters" '632 patent, claim 62: "configuring an estimation module of the tracking or navigation system based on an enumeration of the set of sensing elements available to the tracking or navigation system so that the estimation module can process measurement information from either inside-out sensors, outside-in sensors, or a combination of insideout and outside-in sensors depending on the sensors available" '632 patent, claim 63: "configuring the estimation module includes configuring the estimation module so that the estimation module can process measurement information from either inside-out sensors, outside-in sensors, range sensors, or any combination of the above sensors" 	<p>Plain and ordinary meaning, in light of the claims and specification—<i>i.e.</i>, "module that accepts sensor configuration and measurement information and updates a state estimate using some or all of that information." (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, for claims 47-52, the function is "maintaining estimates of tracking parameters," and the structure is "accepting configuration information from each of the sensor modules regarding the characteristics of the sensors associated with the sensor module, configuring the estimation module using the provided configuration information, and repeatedly (a) passing data based on the estimates of the tracking parameters to one or more of the sensor modules, (b) receiving from said one or more sensor modules data based on measurements obtained from the associated sensors, and the data passed to the sensor modules, and (c) combining the data received from said one or more sensor modules and the estimates of the tracking parameters to update the tracking parameters." In addition, claims 48-52 provide additional structural limitations as applicable to those claims.</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, for claim 68, the function is "estimating a pose of an object based on measurement data from sensing elements," and the structure is "selectively performing (a) receiving data from at least one inside-out bearing sensor, and updating an estimated pose of an object based on the data received from the</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
	<ul style="list-style-type: none"> '632 patent, claim 64: "configuring the estimation module includes configuring the estimation module so that the estimation module can process measurement information from either inside-out sensors, outside-in sensors, inertial sensors, or any combination of the above sensors" '632 patent, claim 65: "configuring the estimation module so that the estimation module can process measurement information from either inside-out sensors, outside-in sensors, dead reckoning sensors, or any combination of the above sensors" '632 patent, claim 68: "estimating a pose of an object based on measurement data from sensing elements" and "enabling selective performance of (a) receiving data from at least one inside-out bearing sensor, and updating an estimated pose of an object based on the data received from the inside-out bearing sensor, (b) receiving data from at least one outside-in bearing sensor, and updating an estimated pose of an object based on the data received from the outside-in bearing sensor, and (c) receiving data from at least one inside-out bearing sensor and at least one outside-in bearing sensor, and updating an estimated pose of an object based on the data received from the outside-in bearing sensor and the inside-out bearing sensor" '632 patent, claim 69: "estimating a pose of an object based on measurement data from sensing elements" and "enabling selective performance of one of: (a) updating an estimate of the position or orientation of the object relative to an 	<p>inside-out bearing sensor, (b) receiving data from at least one outside-in bearing sensor, and updating an estimated pose of an object based on the data received from the outside-in bearing sensor, and (c) receiving data from at least one inside-out bearing sensor and at least one outside-in bearing sensor, and updating an estimated pose of an object based on the data received from the outside-in bearing sensor and the inside-out bearing sensor."</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, for claim 69, the function is "estimating a pose of an object based on measurement data from sensing elements," and the structure is "selectively performing one of (a) updating an estimate of the position or orientation of the object relative to an environment, (b) updating an estimate of the position or orientation, relative to the object, of at least one sensing element fixed to the object, and (c) updating an estimate of the position or orientation, relative to the environment, of at least one sensing element fixed in the environment."</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments laid out in the specification. <i>See, e.g.</i>, '632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, 5, 6, and 12.</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
	<p>environment, (b) updating an estimate of the position or orientation, relative to the object, of at least one sensing element fixed to the object, and (c) updating an estimate of the position or orientation, relative to the environment, of at least one sensing element fixed in the environment”</p> <p>Structure: Indefinite.</p>	
<p>“estimation subsystem”</p> <p>’253 Patent, claims 1, 3, 4, 6</p> <p>’632 patent, claims 1, 2, 4, 14, 33</p>	<p>Function:</p> <ul style="list-style-type: none"> • ’632 patent, claim 1, 2, and 4: “accepting configuration data from the sensor subsystem” and “repeatedly updating a state estimate, including accepting measurement information from the sensor subsystem, and updating the state estimate according to the accepted configuration data and the accepted measurement data” • ’632 patent, claim 14: “calculating a difference between the actual measurement and the expected measurement” • ’632 patent, claim 33: “estimating a position or orientation of an object” • ’253 patent, claim 1, 3: “updating a location estimate for the object based on configuration data and measurement information accepted from the sensor subsystem” • ’253 patent, claim 4: “performing computations independently of an implementation of the sensor modules” • ’253 patent, claim 6: “estimating a position or orientation of an object” <p>Structure: Indefinite.</p>	<p>Plain and ordinary meaning, in light of the claims and specification—<i>i.e.</i>, “subsystem that accepts sensor configuration and measurement information and updates a state estimate using some or all of that information.” (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, for claims 1, 3, and 4, the function is “updating a location estimate for the object,” and the structure is “accepting from the sensor subsystem configuration data and measurement information for localizing an object, and updating a location estimate for the object based on configuration data and measurement information accepted from the sensor subsystem.” In addition, claims 3 and 4 provide additional structural limitations as applicable to those claims.</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, for claim 6, the function is “estimating the position or orientation of the object,” and the structure is “accepting parameters specific to the enumerated sensing elements and estimating the position or orientation of the object based on the accepted parameters.”</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
		laid out in the specification. <i>See, e.g.</i> , '632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, 5, 6, and 12.
<p>“sensor module(s)”</p> <p>'253 Patent, claim 2–4</p> <p>'632 Patent, Claims 47–50, 54, 55, 57, 59–61</p>	<p>Function:</p> <ul style="list-style-type: none"> '632 Patent, claims 47–50, 54–55, 57, 59–61: “providing configuration information to the estimation module regarding characteristics of the sensors associated with the sensor module”; “receiving data based on estimates of the tracking parameters from the estimation module;” and “sending data based on measurements obtained from the associated sensors” '253 Patent, claims 2, 4: “providing an interface for interacting with a corresponding set of one or more sensing elements” '253 Patent, claim 3: “performing computations independently of an implementation of the estimation subsystem” <p>Structure: Indefinite.</p>	<p><u>'632 Patent</u></p> <p>Plain and ordinary meaning, in light of the claims and specification—<i>i.e.</i>, “interface or interfaces between a set of one or more sensors and a tracking system.” (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, the function is “providing information from a set of one or more sensors to the estimation module,” and the structure is “providing configuration information regarding the characteristics of a set of one or more sensors associated with the sensor module, and repeatedly (a) receiving from the estimation module data based on the estimates of the tracking parameters, and (b) providing to the estimation module data based on measurements obtained from the associated sensors and the data received by the sensor module from the estimation module.” In addition, claims 48-50, 54-55, 57, and 59-61 provide additional structural limitations as applicable to those claims.</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments laid out in the specification. <i>See, e.g.</i>, '632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, and 6.</p> <p><u>'253 Patent</u></p> <p>Plain and ordinary meaning, in light of the claims and specification—<i>i.e.</i>, “interface or interfaces between a set</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
		<p>of one or more sensors and a tracking system.” (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, the function is “providing information from a set of one or more sensors,” and the structure is “providing an interface for interacting with a corresponding set of one or more sensing elements.” In addition, claim 6 provides additional structural limitations as applicable to that claim.</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments laid out in the specification. <i>See, e.g.</i>, ’632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, and 6.</p>
<p>“sensor subsystem”</p> <p>’253 Patent, claims 1 and 2</p>	<p>Function:</p> <ul style="list-style-type: none"> ’253 Patent, claims 1, 2: “providing configuration data to the estimation subsystem and ... providing measurement information to the estimation subsystem for localizing an object” <p>Structure: Indefinite.</p>	<p>Plain and ordinary meaning, in light of the claims and specification—<i>i.e.</i>, “subsystem that provides configuration information and measurement information from sensors to the estimation subsystem.” (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, the function is “providing information to the estimation subsystem for localizing an object,” and the structure is “providing configuration data to the estimation subsystem, and providing measurement information to the estimation subsystem for localizing an object.”</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments laid out in the specification. <i>See, e.g.</i>, ’632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, and 6.</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
<p>“data processing module”</p> <p>'632 Patent, claim 66 and 67</p>	<p>Function:</p> <ul style="list-style-type: none"> '632 Patent, claim 66: “selectively performing one of (a) receiving data from at least one inside-out bearing sensor, and updating an estimated pose of an object based on data received from the inside-out bearing sensor (b) receiving data from at least one outside-in bearing sensor, and updating an estimated pose of an object based on data received from the outside-in bearing sensor, and (c) receiving data from at least one inside-out bearing sensor and at least one outside-in bearing sensor, and updating an estimated pose of an object based on data received from the outside-in bearing sensor and the inside-out bearing sensor” '632 Patent, claim 67: “selectively performing one of (d) receiving data from at least one range sensor, and updating an estimated pose of an object based on data received from the range sensor, (e) receiving data from at least one range sensor and at least one inside-out bearing sensor, and updating an estimated pose of an object based on data received from the range sensor and the inside-out bearing sensor, (f) receiving data from at least one range sensor and at least one outside-in bearing sensor, and updating an estimated pose of an object based on data received from the range sensor and the outside-in bearing sensor, and (g) receiving data from at least one range sensor, at least one outside-in bearing sensor, and at least one inside-out bearing sensor, and updating an estimated pose of an object based on data received 	<p>Plain and ordinary meaning, in light of the claim and specification—<i>i.e.</i>, “module that, based on configuration information indicating a set of available sensing elements and data from at least one sensor, updates an estimated pose of an object.” (35 U.S.C. § 112, ¶ 6 does not apply.)</p> <p>If 35 U.S.C. § 112, ¶ 6 applies, the function is “updating an estimated pose of an object,” and the structure is “software component configured based on sensor configuration information indicating a set of sensing elements available to a tracking or navigation system and selectively performing one of (a) receiving data from at least one inside-out bearing sensor, and updating an estimated pose of an object based on data received from the inside-out bearing sensor, (b) receiving data from at least one outside-in bearing sensor, and updating an estimated pose of an object based on data received from the outside-in bearing sensor, and (c) receiving data from at least one inside-out bearing sensor and at least one outside-in bearing sensor, and updating an estimated pose of an object based on data received from the outside-in bearing sensor and the inside-out bearing sensor.” In addition, claim 67 provides additional structural limitations as applicable to that claim.</p> <p>Plaintiffs reserve the right to rely on exemplary (but not limiting) structure in the description of the embodiments laid out in the specification. <i>See, e.g.</i>, '632 Patent at 2:21–11:8, 12:3–46:17; and Figs. 2, 3, 5, 6, and 12.</p>

Term	Defendants' Proposed Construction	Plaintiffs' Proposed Construction
	<p>from the range sensor, the inside-out bearing sensor, and the outside-in bearing sensor”</p> <p>Structure: Indefinite.</p>	